current density in the base width W direction (or in the Y-axis direction), whereby ESD endurance is reduced.

SUMMARY OF THE INVENTION

[0013] In an aspect of the present invention, an ESD (Electrostatic Discharge) protection element includes a bipolar transistor comprising a collector diffusion layer connected with a first terminal and an emitter diffusion layer; and current control resistances provided for a plurality of current paths from a second terminal to the collector diffusion layer through the emitter diffusion layer, respectively.

[0014] In another aspect of the present invention, an ESD (Electrostatic Discharge) protection element includes a bipolar transistor comprising a collector diffusion region connected with a first terminal and an emitter diffusion region; and current control resistances provided for a plurality of current paths from a second terminal to the collector diffusion region through the emitter diffusion region, respectively.

[0015] An ESD protection element according to the present invention makes it possible to enhance an ESD resistance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The above and other objects, advantages and features of the present invention will be more apparent from the following description of certain embodiments taken in conjunction with the accompanying drawings, in which:

[0017] FIG. **1** is a cross sectional view showing a structure of a conventional ESP protection element along A-A' shown in FIG. **2**;

[0018] FIG. **2** is a plan view showing a structure of the conventional ESD protection element;

[0019] FIG. **3** shows an equivalent circuit of the conventional ESD protection element;

[0020] FIG. **4** is a plan view showing a structure of an ESD protection element according to a first embodiment of the present invention;

[0021] FIG. **5** is a cross sectional view showing the structure of the ESD protection element according to the first embodiment of the present invention along B-B' shown in FIG. **4**;

[0022] FIG. **6** shows an equivalent circuit of the ESD protection element according to the first embodiment of the present invention;

[0023] FIG. **7** is a plan view showing a structure of the ESD protection element according to a second embodiment of the present invention;

[0024] FIG. **8** is a cross sectional view showing the structure of the ESD protection element according to the second embodiment of the present invention along C-C' shown in FIG. **7**;

[0025] FIG. **9** shows an equivalent circuit of the ESD protection element according to the second embodiment of the present invention;

[0026] FIG. **10** is a plan view showing the structure of the ESD protection element according to a third embodiment of the present invention;

[0027] FIG. **11** is a cross sectional view showing the structure of the ESD protection element according to the third embodiment of the present invention along D-D' shown in FIG. **10**;

[0028] FIG. **12** shows an equivalent circuit of the ESD protection element according to the third embodiment of the present invention;

[0029] FIG. **13** is a plan view showing a modified example of the structure of the ESD protection element according to the third embodiment of the present invention;

[0030] FIG. **14** is a cross sectional view showing the structure of the modified example of the ESD protection element according to the third embodiment of the present invention along E-E' shown in FIG. **13**;

[0031] FIG. **15** is a plan view showing the structure of the ESD protection element according to a fourth embodiment of the present invention;

[0032] FIG. **16** is a cross sectional view showing the structure of the ESD protection element according to the fourth embodiment of the present invention along H-H' shown in FIG. **15**;

[0033] FIG. **17** shows an equivalent circuit of the ESD protection elements according to the fourth to seventh embodiments of the present invention;

[0034] FIG. **18** is a plan view showing the structure of the ESD protection element according to a fifth embodiment of the present invention;

[0035] FIG. **19** is a cross sectional view showing the structure of the ESD protection element according to the fifth embodiment of the present invention along I-I' shown in FIG. **18**;

[0036] FIG. **20** is a plan view showing the structure of the ESD protection element according to a sixth embodiment of the present invention;

[0037] FIG. **21** is a cross sectional view showing a structure of the ESD protection element according to the sixth embodiment of the present invention along J-J' shown in FIG. **20**;

[0038] FIG. **22** is a plan view showing the structure of the ESD protection element according to a seventh embodiment of the present invention;

[0039] FIG. **23** is a plan view showing a modified example of the ESD protection element according to the seventh embodiment of the present invention;

[0040] FIG. **24** is a plan view showing a modified example of the structure of the ESD protection element according to the fourth embodiment of the present invention;

[0041] FIG. **25** is a cross sectional view showing the structure of the ESD protection element according to an eighth embodiment of the present invention;

[0042] FIG. **26** is a cross sectional view showing the structure of the ESD protection element according to a ninth embodiment of the present invention;

[0043] FIG. **27** is a plan view showing the structure of a modification of the ESD protection element according to the third embodiment of by the present invention;

[0044] FIG. **28** is a plan view showing a structure of a modification of the ESD protection element shown in FIG. **27**;

[0045] FIG. **29** is a cross sectional view of the ESD protection element along the line I-I' shown in FIG. **28**; and

[0046] FIG. **30** is a plan view showing a structure of another modification of the ESD protection element according to the third embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[0047] Hereinafter, an ESD (Electrostatic Discharge) protection element of the present invention will be described in detail with reference to the attached drawings. In the embodiments described below, the ESD protection element using a